GARDEN AND FOREST.

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TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—Various Motives for Gardening 341
The Destruction of the Nation's Forests 341
The Necessity of Planning ..... *Charles Eliot.* 342
The Wild Gardens of the Sierra ..... *Charles H. Shinn.* 343
NEW OR LITTLE-KNOWN PLANTS:—Lonicera hirsuta. (With figures.) 344
FOREIGN CORRESPONDENCE:—London Letter ..... *W. Watson.* 345
CULTURAL DEPARTMENT:—Funkias ..... *Robert Cameron.* 347
Autumn-flowering Bulbous Plants ..... *T. D. Hatfield.* 347
Orchid Notes ..... *E. O. O.* 348
CORRESPONDENCE:—Two Good Trees for California Planting ..... *H. G. Pratt.* 348
THE FOREST:—The Burma Teak Forests.—IV. ..... *Sir Dietrich Brandis.* 348
NOTES 350
ILLUSTRATIONS:—Lonicera hirsuta, Fig. 45 344
Lonicera hirsuta × Sullivantii, Fig. 46 345

Various Motives for Gardening.

WE have just received a letter from a valued correspondent in which he says that he cannot understand the insistence of GARDEN AND FOREST upon planning and planting for general effect. He delights in his garden, but his pleasure is not associated in any degree with the landscape as he understands it. He loves plants, he appreciates the beauty of flowers, he enjoys their companionship and he reads with interest everything that is said about new or old ones which any way broadens his knowledge of their habits and helps him to cultivate them more successfully. He finds abundant comfort in gardening of this kind, but he sees nothing to attract him in landscape-gardening. No doubt, this statement represents the innermost feeling of many people who take a genuine interest in horticulture, and it is often expressed to us in one way or another. With people of this taste and temperament the garden exists for its plants, and the plants are not grown for the sake of the garden. That is, a garden in this view is a place where a collection of plants is carefully attended and enjoyed for their individual beauty and other interesting qualities, and with no purpose of forming, in connection with the house, any picture which is to be studied and enjoyed as a whole. Perhaps the majority of all who are interested in gardens sympathize with the view of our correspondent, and they find a real pleasure, and pleasure of a most refining and refreshing kind, in their practice. It is our belief, however, that they might do all this, and at the same time gain a new and ever-growing satisfaction if they gave thought to the general modeling and arrangement of the whole scene as well as to its individual details.

No doubt, the word "landscape" is something misleading when the term landscape-gardening is applied to small areas, but, then, we have no phrase to take its place. In the design of a village plot we may have nothing to do with the material that was in Lowell's mind when he said, "A real landscape never presents itself to us as a disjointed succession of isolated particulars, its lights, its shadows, its melting gradations of distance." In ordinary use, the word "landscape" conveys an idea of some spaciousness—a foreground, a middle distance and a distance—but, nevertheless, it is possible even in a limited space to carry out a scheme which as a whole makes a distinct and consistent appeal to the eye and to the imagination. Such a garden must embody and express some idea which the observer can feel and appreciate. It may be made a type of coziness or of simple homelike restfulness or of inviting hospitality or even of studied elegance, but to achieve such a result is not easy. Nevertheless, a moderate-sized house-scene may be a genuine work of art which displays the creative touch of genius. This only comes to pass when the true artist discovers the hidden poetry of the place, and knows how to handle and adjust all his material to give the theme its full and complete expression.

Landscape-gardening of this type is much more than the arrangement of plants and trees so as to exhibit harmonies of form and color. It is possible to make beautiful and effective arrangements without attempting any such expression as we have alluded to, and yet the arrangement of plants solely for the sake of their form and color may be truly artistic. It requires the same kind of skill which groups cut flowers into effective bouquets or arranges them into effective table decorations, or which creates a charming mosaic pavement out of bits of different-colored stone. No doubt, our correspondent, who loves each plant as an individual, will understand that he can enjoy his Ascension Lilies and his Delphiniums just as thoroughly as he now does if they were planted together, so that each would heighten the beauty of the other, or he can appreciate in what exquisite harmony his white and yellow Eschscholtzias dwell together, or how the attractiveness of his white and scarlet Poppies is emphasized when under a glowing sun they are seen against a mass of dark foliage. Whatever name is given to the art which achieves such pleasing combinations it certainly is worth study, and it brings with it a high order of pleasure. Without it there can be good formal arrangements in connection with architecture, no success in regular planting which ought to be an essential feature in many small and geometrical areas. This kind of art differs, perhaps, from what we generally know as landscape-art, in that it appeals more directly to the æsthetic sense and can hardly be said to move the emotions.

Now, the man who loves his plants for their own sake may still arrange them so as to make an effective display of form and color, or he may subordinate them to the creation of a landscape picture which expresses some idea, some inner meaning, but no one can justly find fault with him if he goes on as he is now doing and enjoys his plants simply for what each one is to him. His garden will be a constantly increasing solace and refreshment and he will take a keen delight in it. It is gardeners of this sort who make a personal acquaintance with their plants and by an intimate study of them discover all their secrets, their habits and even their whims. They find something new every morning, something to invite study or admiration. They are the men who become our ablest instructors in all points of culture. Mr. Olmsted has somewhere called this art specimen-gardening, to distinguish it from parterre-gardening and landscape-gardening proper.

A MEMBER of the New Jersey Forestry Association asks us for an approximate estimate of the number of acres of timber-land still owned by the National Government. Unfortunately, we have no information on this point which is sufficiently accurate to base a guess upon. Aside from the forest reservations the Government may possess so-called forest-lands to the extent of twenty-five million acres or of twice that amount. This area is passing into private hands and vanishing at the rate of a million acres a year, or, perhaps, two million, no one knows. The stumpage value of the timber stolen every year may be a million dollars, or more, but no one knows. No one knows

how much timber the flocks and herds destroy, nor how much is annually burned up. We do know that every year corporations and individuals are acquiring title to hundreds of thousands of acres of forest-land which should be kept in forest forever. We do know that there are no laws to properly protect our forest. We do know that even the inadequate laws on the statute-books are not enforced. We do know and we have known enough for years to make our neglect of this great property, with all its beneficent possibilities for the future, a national disgrace. Certainly the Forest Commission which is now in the field ought to be able to make a report which will stir the country and drive those who make and administer our laws to some efficient action.

The Necessity of Planning.

THE daily work of the architect and the landscape-architect is popularly supposed to consist in ornamenting lands and buildings so as to make them appear beautiful. Rooms may be inconveniently and awkwardly shaped, but they can be "beautified" by rich furniture and upholstery. Whole buildings may be irrationally planned, but they may still be made "artistic" by means of mouldings, carvings and mosaic. House grounds and college grounds, private gardens and public parks may be senselessly, as well as ineffectively, arranged, but they may still be glorified by yellow and purple leafage. In short, "The world is still deceived with ornament."

On the other hand, although all seekers for the truth concerning beauty have discerned elements which defy analysis, such special students have nevertheless deduced from the visible and historical facts a whole series of fixed principles, which are quite as surely established as any of the other so-called laws of nature. Among these, perhaps, the most important is this, that "in all the arts which serve the use, convenience or comfort of man, from gardening and building down to the designing of the humblest utensil which it is desired to make beautiful, utility and fitness for intended purpose must be first considered." It is to be remembered that this is not theory but law. As a matter of fact and experience satisfying beauty is not won unless the law of nature is obeyed.

That faithful and well-reasoned planning for the accomplishment of purpose is necessary to the success of the work of architects of buildings is now generally understood. "A plan" is a skillful combination of convenience with effectiveness of arrangement. "A design" is made up of plan, construction and outward appearance, and by no means consists of the latter only. Indeed, the external aspect of a structure depends directly on the mode of construction, the construction depends, in turn, on the plan, and the plan on the purpose in view; with the result that the whole appearance of the building inevitably and naturally expresses this purpose.

If it be true that expression, character, and even beauty are thus most surely won, in the case of buildings, by keeping decoration subsidiary and designing with purpose in view from the start, it is equally true of all the wide field of architecture, using the word in its broadest imaginable sense. "Architecture, a great subject, truly," says William Morris, "for it embraces the consideration of the whole of the external surroundings of the life of man; we cannot escape from it if we would, for it means the moulding and altering to human needs of the very face of the earth itself." A bushy pasture or a smooth green field in forest-clad New England is as truly a product of human handiwork as a green meadow in treeless and dusty Utah, yet each is beautiful, and neither owes a particle of its beauty to decoration. The English deer-park, with its broad-spreading trees, or the church-yard, with its ancient stones and yews, the typical Yankee farm with its low buildings and great Elms, or the Live Oaks and quaint structures of the plantations of Louisiana, these and all similarly interesting landscapes are interesting, not because they have been decorated, but because they are strongly characterized and highly expressive. Their moving beauty is the natural product of straightforward work for the adaptation of land and landscape to human needs and uses.

Believing these things, it will be impossible for us, when a tract of land is newly dedicated to some special purpose, be it that of a suburban lot, a railroad-station yard, a new village, a country-seat or a public park, to stand by and see it thoughtlessly laid out and then, perhaps, turned over to the decorators. We shall insist on premeditation and careful fundamental planning, knowing that therein lies the best, if not the only, hope of happy results. Once possessed of faith in that law of nature in accordance with which beauty springs from fitness, we shall be ready to agree that, when purpose is served, formal gardens, rectilinear avenues and courts of honor are not only permitted, but commanded. On the other hand, we shall be equally strenuous in demanding studied planning and adaptation to environment and purpose in the laying out of whatever work may need to be done to make the wildest place of private or public resort accessible and enjoyable. Positive injury to the landscape of such places can be avoided only by painstaking, while the available resources of scenery can be economized only by careful devising. So with the whole range of problems which lie between these extremes. No work of man is ever successfully accomplished without taking thought beforehand; in other words, without planning.

And, strange as it may appear, opposition to such planning for effective results will not, in practice, be found to come from those who attempt decoration only because they know not how else to attain to the beautiful. Just as the literary class in China ruinously opposes change of any kind, so there is with us a comparatively small, but influential, body of refined persons, far too well educated to be "deceived by ornament," who most unfortunately, though unintentionally, assist in the triumphs of ugliness by blindly opposing all attempts to adapt land and landscape to changed or new requirements. Enjoying the pleasanter scenery of their surroundings as it exists—certain shady roads, or some lingering fields or farm-lands—these estimable people talk of "letting Nature alone" or "keeping Nature natural," as if such a thing were possible in a world which was made for man. No, the "moulding and altering" of the earth goes forward of necessity, and if those who ought to be leaders will not help to guide the work aright, the work will surely be done badly; as it is, in fact, done badly in the neighborhood of all our great towns. To refuse to exercise foresight and to adapt to purpose in due season, is simply to court disaster. Instead of hanging back, it ought to be the pride and pleasure of these very people to see to it that proper plans are seasonably laid for the widening of roads so that fine trees shall not be sacrificed, to see to it that electric-car tracks shall be placed only in suitably selected and specially arranged streets, that public reservations of one type or another shall be provided in accordance with some consistent general scheme, and that such reservations shall be saved from both decorative and haphazard development by the early adoption of rational and comprehensive plans. There is needed a little less selfish contentment in the the doomed landscape of the present, a sharper sense of responsibility to the future and a living faith in that law of God, in obedience to which everything which is well adapted to use and purpose is sure to be interesting and expressive, and if not beautiful, at least on the way to be.

Brookline, Mass. *Charles Eliot.*

If you would make acquaintance with Ferns you must forget your science and approach them as something strange, and with no introduction from a learned man. Nothing is easier than to find out the position of the fruit dots, or the character of the indusium. But if you are to be affected by Ferns, if they are to amount to anything, signify anything to you, be another sacred scripture and revelation to you, helping to redeem your life, this end is not so easily accomplished.—*Thoreau.*

The Wild Gardens of the Sierra.

OUR California Sierra is five hundred miles long and seventy miles wide. The elevation is from 6,000 to nearly 15,000 feet. No great mountain range is more easy of access or better adapted to outdoor life. John Muir calls it not the Snowy Range, but the Range of Light, so marvelous are its sunbursts of morning, its clear noonday radiance from glacier-polished rocks and gleaming snows, its golden rivers of sunset, its alpine moonlights and starlights, its glories of blossoms of every hue, but chiefly white, blue, scarlet, golden, and all sorts of clear, vivid colors.

Wonderful are the peaceful mountain lakelets that find places on no maps—pellucid, transparent, hidden in sheltered hollows of glacial valley-basins, at the tips of ancient moraines, or strung like beads on mountain streams, as in Lake Hollow in Tolumne Cañon, where ten such lakes lie close together. These snow-fed pools begin to throw off the chains of winter in May, June or July, according to the altitude, and then their margins suddenly run riot with a most bewildering variety and multitude of plants. Thousands of attractive lakelets exist in the Sierras; in the Merced district alone, Muir notes 131 of not less than five hundred yards in circuit; other thousands of hollows, once occupied by lakes, have now become green and blossoming meadows, while some are in the transition state—cold swamps where the Droseras grow, and one may look for Darlingtonia, or find in deeper channels the Nuphar polysepalum.

The margins of these countless lakelets are soft with Mosses, pale green Hypnums, silky and lustrous Dicranums, dark Polytrichums and other Musci; green and purple Sphagnums, slender, flat-branched Selaginellas, and a multitude of as delicate plant-carpetings. In such wet places rise the tall stems and graceful white perianths of Spiranthes Romanzoffiana, the Sierra Ladies' Tresses, with white and greenish Habenarias. Sometimes one finds the white-racemed Hastingsia, Sagittaria variabilis, or the Damasonium Californicum of Torrey, with many species of Juncus in the water edges. In a few cases, the ripe, salmon-colored capsules of the Bog Asphodel, Narthecium, gleam over the lesser water plants; and along the moister levels, whole acres of tall Veratrums, or False Hellebore, uplift their broad leaves and heavy spikes of dull cream-colored and greenish flowers. Mingled with the Rushes are bright green Quillworts, Isœtes, and the cordate-leaved Caltha Leptosepala. Every inch of ground is occupied with overflowing plant-life.

Bright-hued Mountain Grasses, Stipas, Festucas, Trisetums, Bromi, Calamagrostes and many more give soft hues of brown, purple and gold as they bloom and ripen on the sunny slopes or beside the blue lakelets. Beetles, ants, dragon-flies, Vanessas, Papilios and many other species of butterflies in busy armies crawl and flutter through the warm summer land; mountain quail and grouse are in the thickets of dwarf Pines, Oaks, Poplars and Willows. Robins, swallows, grosbeaks and goldfinches are nesting or singing in tree-tops by rushing rivers and waterfalls; while the water ousel, swift bird-wonder, flashes through the spray, and the saucy Douglas squirrel, Sciurus Douglasi, makes a lively part of every scene.

But I have hardly begun to describe the variety of plant-life upon the shores of the lakelets in the alpine meadows and on the descending rock slopes. Around such lakes are vivid golden Ranunculi in many shades, Ranunculus Andersonii, R. oxynotus, R. alismæfolius and others; purple-beaked Dodecatheons, dwarf Mimuli, yellow or pink, with crimson-spotted or copper-red hoods; bee-haunted Limnanthes, white and pale yellow; rose-tinted Claytonias; tall, fragrant Trifoliums, red, white or purple-flowered, massed by dripping springs against still statelier Aralias, Ferulas and Heracleums, or grouped with white and yellow Hosackias by the edges of splintered granite rocks, while underfoot are nodding Pearlworts, modest little Stellarias and Cerastiums and the water-loving Lobelia carnosula. Creeping Violas, white, yellow and blue, are blossoming by thousands in the warm half-shade; under the trees one may at rare times find the delicate Anemone multifida; the Aconitum Fischeri lifts its pale blue flowers and pubescent stems through acres of orange-yellow and red-spotted Lilies, L. pardalinum, and near it is the pale lilac of Clarkia rhomboidea. By some of these alpine lakes the dwarf Willows are mingled with purple-flowering Kalmias, fringes of Cassiope and fragrant Vacciniums, Symphoricarpi and Loniceras, which by September add their glowing white and orange-red berries to the reds and rose-purples of the dwarf Mountain Ribes.

If a mountain torrent falls into the lake hollow you shall find many Saxifrages, white, creamy brown or purple, hanging to the damp rocks. Primula suffrutescens will be there also, and where the spray dashes are white-blossoming Rubus leucodermis. On almost every sheltered, soil-covered shelf of rock millions of creamy yellow and purple-shaded Erythroniums begin to blossom as the snow melts and linger until the lake-shores fairly waken. Hidden at the bases of the crags are multitudes of Asters and Aquilegias (A. truncata), and if one climbs far enough he can find the large-flowered blue and white A. cœrulea.

The blossoms of the hill-sides, ravines and rocks are so many and so varied that every cañon and lake-basin has its distinctive features, and a complete list would be merely a catalogue. Rose or flesh-colored Dicentras hide among the grasses; Silenes, pink, white, scarlet or purple, cluster about rock points; Castilleias, yellow-red and fire-tipped, deepening to almost crimson; vivid scarlet Zauschnerias and crowded glowing masses of blue Lupines illuminate the landscape; white and rose-colored Phloxes; Pentstemons of pink, violet and blue; close-knit corymbs of rose-hued Spiræas; the almost prostrate, dense-clustered scorpioid spikes of Sprague's; silky, glistening cups of Lewisia rediviva—these, with an enormous number of wonderfully glowing Compositæ, clothe the dry, granite dust and furrows of the dark rocks. Helianthi, Wyethias, Erigerons, Golden-rods, Heleniums, and many others great and small, by lake-shores and streams and to the limits of alpine vegetation, mark the sway of the Compositæ in the Sierras. Often the color-scheme is strongly blue and gold for miles, for the tall Forget-me-nots, the lovely Gentians, such as Gentiana Amarella, G. simplex and G. calycosa, the fine alpine Linums, Lupines, Larkspurs and other vividly blue flowers quite hold their own with the rich Compositæ.

Especially brilliant, also, are some of the alpine Ericaceæ, such as Bryanthus Breweri, that dwarf evergreen with thick, obtuse, Heath-like leaves and saucer-shaped rose-purple blossoms gleaming upon high and rocky peaks of the Sierras. Another lovely Heath is the white or rose-colored Cassiope, a suffrutescent evergreen, with finely imbricated foliage. These grow far above the Oaks and the dwarf, trailing Manzanitas, where Hemlock Spruces, Tsuga Pattoniana, and mountain Pines, Pinus albicaulis and P. monticola, are the outposts of the great Sierra forests. Still one finds golden Compositæ, brighter and more luminous than ever, in great congregations close to the edges of the glaciers. Again, as far down by the lake hollows, the Mosses and other forms of lesser plant-life take the place of the glowing hosts of the mid-Sierra. The Woodsias and larger Ferns disappear, but Pellæas, Allosori, Cheilanthes and Cystopteris have grown in the shadows of granite crags and in crevices of the giant mountains all the way from the land of Lilies, of wild Sierra Roses and of thickets of white-flowered Prunus emarginata. On the gray pinnacles, among sky-blue Flaxes, silvery Astragali, with cream-white and purple flowers and mottled pods, rattle sharply in the winds. Alpine Sages creep up from the Nevada desert plateau and make the eastern horizon gray. The blue and white Polemoniums, the hoary Lithospermum pilosum and other flowers of the highest peaks are found here in gardens of their own.

Niles, Calif. *Charles H. Shinn.*

New or Little-known Plants.

Lonicera hirsuta.

THIS native twining high-climbing Honeysuckle (see illustration on this page), although now rarely seen in cultivation, is well suited to enliven the garden with its ample dark green foliage and terminal and axillary clusters of bright orange-colored hirsute fragrant flowers, which open in June, and in fading turn to dull purple or brown.

Lonicera hirsuta inhabits rocky banks or climbs over bushes and fences, and is distributed from the province of Ontario along the northern shores of Lake Superior to the Saskatchewan, and southward to Pennsylvania and Michigan. In gardens it may be used to cover trellises and arbors, to grow over coarse shrubs and to climb into small trees; and as a garden plant it is superior to the much more commonly planted Lonicera Sullivantii (see Garden and Forest, vol. iii., p. 187, f. 34), which is a less vigorous plant and more frequently disfigured by insects and disease.

With Lonicera hirsuta is grown in the Arnold Arboretum a climbing Honeysuckle (see illustration on page 345), which is intermediate between Lonicera hirsuta and Lonicera Sullivantii in the color and pubescence of the leaves and flowers, and may be a natural hybrid between these species. Nothing of its origin is known beyond the fact that it was raised from a cutting taken from a plant which long grew in the Harvard Botanic Garden at Cambridge. The specimen in the Arboretum is a vigorous plant with glabrous stems, light green leaves destitute of the bloom which distinguishes those of Lonicera Sullivantii, and pale and covered below with short pubescence, and orange-colored flowers slightly pubescent on the corolla-tubes. Although more vigorous in habit and general appearance, this plant resembles Lonicera Sullivantii, but the pubescence on the lower surface of the leaves and the color and pubescence of the flowers suggest a hybrid origin. The plant cultivated in the Botanic Garden of Copenhagen as Lonicera media (Coll. G. Nicholson, No. 4132) appears to be the same thing.

Fig. 45.—Lonicera hirsuta.

Foreign Correspondence

London Letter.

SWANLEY COLLEGE is a teaching school of horticulture for young men and women, most of whom are residential, the course of training being two or three years of practical horticulture combined with class-room work. Sir William Hart Dyke, Bart., M. P., who presided recently at the prize distribution among the students, said the college was absolutely unequaled in the educational system of the country, for it was the only school where the students, male and female, paid attention to both the practical and the theoretical side of horticulture. It was specially satisfactory to him to know that the governors took a deep interest in the practical branch, for education nowadays was somewhat too bookish. Speaking of foreign competition he remarked that it was interesting to notice how foreigners were taught to use their hands. In the matter of railway work he had seen abroad men who were able to pack into three trucks the material which in Great Britain went into four; this, of course, resulted in a great saving of money. There were few pleasanter occupations than gardening; certainly it was a better way of obtaining a livelihood than by working in a mine or a factory, or sweating in some den. During the proceedings it was remarked that for every woman who had left the college a lucrative and satisfactory appointment had been found. It is well that attention should be called to the wisdom of practical teach-

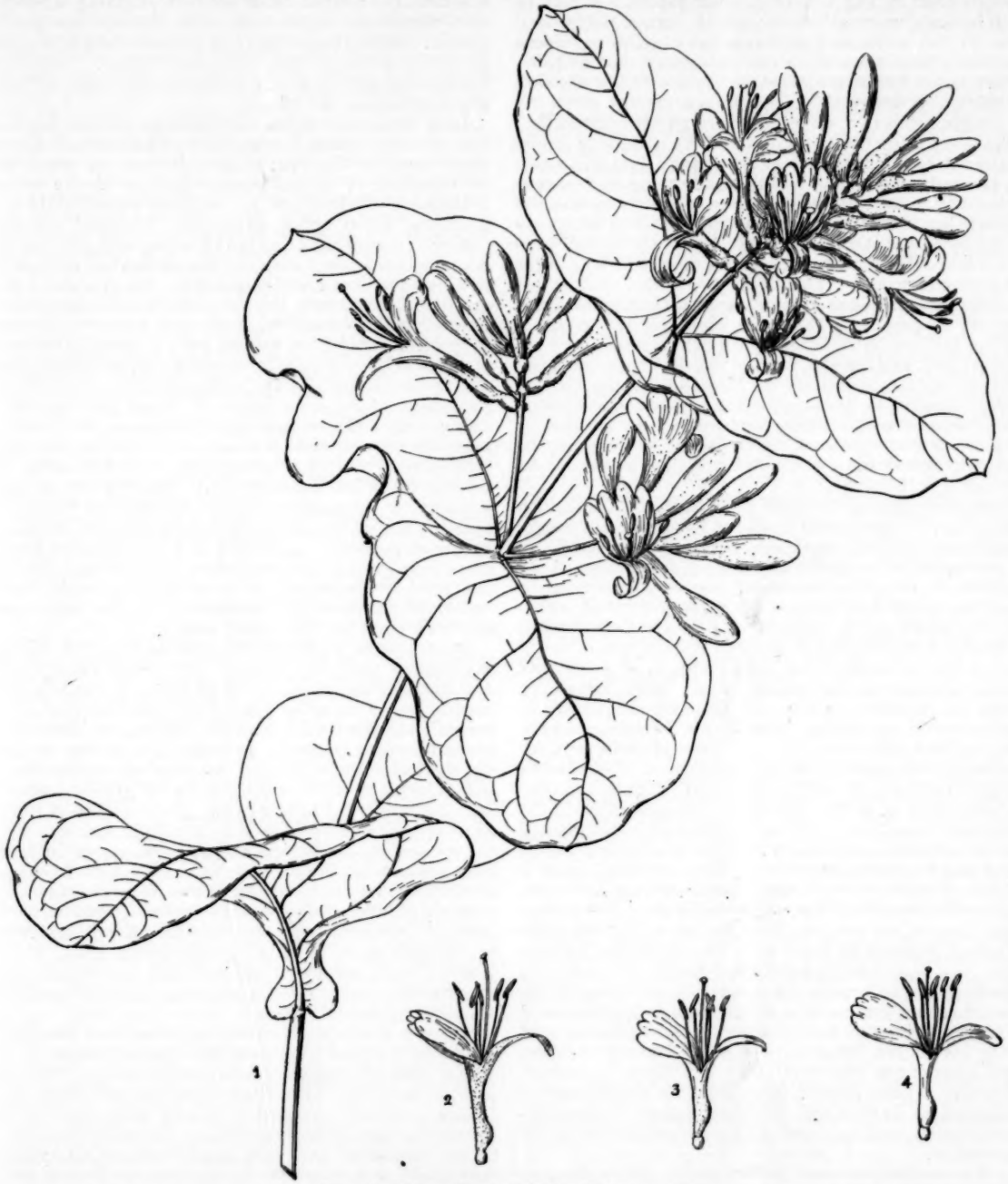

Fig. 46.—Lonicera hirsuta × Sullivantii.—See page 344.
1. Flowering branch, natural size. 2. Flower of L. hirsuta, natural size. 3. Flower of hybrid, natural size. 4. Flower of L. Sullivantii, natural size.

ing, the tendency lately having been to set up a bookish knowledge of horticulture as preferable to that obtained by actual practice, on the assumption that the man who could talk or write about work was more likely to be a competent performer than the man who can work but cannot deliver orations or write essays about it.

Royal Gardens, Kew.—The following paragraph has been published in *The Times* and other papers. It may be said to indicate unusual interest on the part of the general public in the work and development of Kew: "Some important alterations are now being carried out at Kew. The temperate house, projected by the late Prince Consort, was originally designed to comprise a central structure, two octagons and two wings. The wings were not added; but the Government has now granted the necessary funds, and already such progress has been made that the south wing is nearly completed, and the north wing will be constructed at the earliest possible date. When finished, the temperate house will be one of the most striking and probably the largest of the kind in existence. Its central avenue will be six hundred feet long, and there will be a clear view from end to end. This, it may be added, will be just double the length of the present largest house—the Palm house—in the gardens. The south wing will be used especially for the accommodation of succulent plants, Agaves, the taller Cacti, and the like, from such subtropical countries as the Cape, the highlands of Mexico, and the Canary Islands. Limited in the area of their growths, the plants have hitherto been necessarily confined in tubs, but in their new quarters they will be out in beds, where they may be expected to flower and add a new attraction to the Royal Gardens."

Coöperation among Gardeners and Farmers.—The British Produce Supply Association has been formed to encourage the cultivation of fruit, vegetables, etc., in the United Kingdom and assist in its distribution among consumers. Lord Winchilsea is the principal mover in the scheme, which already has made considerable progress toward organization. The scheme now includes not merely the existence of a central body in London for the collection and distribution of British produce, but the formation of a network of local associations throughout the United Kingdom, working in complete harmony with the central body in accordance with the general principles laid down, yet each having its own administration, and arranging, in turn, for the thorough organization of its own district. The first of these local bodies is now being formed in south Lincolnshire, with Sleaford as the centre, the idea being that, in the initial stage, operations shall be commenced in that county under the personal supervision of Lord Winchilsea, and a more or less perfect model secured, which can be copied in other counties afterward. Some little anxiety had been felt as to the actual extent to which the farmers and market growers themselves would support the movement, for while the £50,000 required to begin with by the central body in London has been readily subscribed by six hundred and fifty leading landowners in the country, it was felt that the success of the movement as a whole would largely depend upon the help given by the producers in the formation and carrying on of the local associations. The result shows that the scheme has been received with great favor in south Lincolnshire, where, indeed, there is hardly a cultivator of any standing at all who has not taken shares in the Sleaford association, and thus secured a personal interest in its future welfare.

The Royal Horticultural Society is this year endeavoring to extend its influence to the provinces of England by means of deputations of representative horticulturists which attend plant exhibitions, where, by giving lectures, awarding prizes and in other ways showing an interest in the exhibits, they add to the importance of the occasion and give valuable assistance. Exhibitions at York and at Chester have already received this attention from what is now known as the "parent" society of horticulture. At Chester last week the President, Sir Trevor Lawrence, Dean Hole and Mr. F. W. Burbidge were the principal representatives of the society, taking part in the conference by reading papers. That by Sir Trevor was on the History of the Royal Horticultural Society; Dean Hole discoursed humorously on Garden Craft, and Mr. Burbidge dealt with the Literature of Horticulture. The Dean was particularly happy in his gibes at the people who pretend to love horticulture, but neither know nor care anything about it. He also struck the right note when he warned gardeners against too great an anxiety to improve nature, such efforts too often ending in disfigurement or worse. Statues, mud-banks, stagnant pools and brickbats were also ridiculed as abominations in the garden.

Iron versus Wood for Greenhouses.—Some horticulturists, whom I think I may term old-fashioned, are prejudiced against the use of iron instead of wood in the construction of plant-houses because of the supposed coldness of the iron and its excessive contractility in cold weather. From actual experience, I should say there is practically nothing in this objection, and looking at the enormous difference between the amount of light possible in an iron structure compared with one of wood I should say that, bar expense, the argument is all in favor of iron. I have lately seen several large new conservatories which support this contention, those built of iron, or, better still, of cast-steel, being lighter, more elegant and horticulturally far superior to the wooden ones, although these latter are, according to the architect, as light as they can be with safety. An architect does not understand that every inch of opaque roof-surface is a loss to the plants, and that the most perfect roof for a plant-house, were it possible, would be one of entire transparency. Where wood is used on account of cheapness it should be reduced to the lowest possible minimum, the panes of glass being as wide and strong as possible. It should not be forgotten that stout glass is in itself a great stiffener in structure. The experience of horticulturists in your country ought to be of value, the extremes of temperature with you being a greater test than what we experience here.

Bulb-farming in Scilly.—The small group of islands off the extreme point of Cornwall have lately become important horticulturally as sources of the best samples of Narcissi bulbs. Originally started with the object of growing forced Daffodils for the English market, the farmers soon found themselves overstocked with bulbs, but on marketing the bulbs the prices realized were so satisfactory that the bulbs are now looked upon as of greater importance than the flowers. The growers grade the bulbs annually, sending the largest and best to the bulb dealers, planting the second size for flowers and to grow on, while the small ones are put into the nursery-beds. English dealers prefer Daffodils from Scilly before those from Holland. Other bulbous plants besides Narcissi are being tried on the same lines. The development of this lucrative industry is due to the enterprise of T. A. Dorien-Smith, Esq., of Tresco Abbey, who devotes a considerable portion of land to experimental bulb-culture and invites his neighbors to copy his most successful efforts.

Solanum cernuum.—The August number of *The Botanical Magazine* contains a figure of this species, which, for some years, has been a conspicuous plant in the temperate house at Kew, under the synonymous name of Solanum jubatum. It has an erect, unbranched woody stem ten feet high, bearing a head of large spreading oblong leaves two feet by one and a half feet, dark green, leathery, silvery on the under side, and, when young, clothed on both sides with long brown scurf-like hairs, the petiole and stem being permanently clothed with similar hairs. The flowers, which are borne in short cernuous cymes about the bases of the leaf-stalks, are white, with yellow anthers, and on strong plants they are produced in sufficient abundance to make a good show. The principal value of the species, however, is as a striking foliage-plant for a cool greenhouse, its large, bold foliage and tree-like habit adapting it for large conservatories. It may be propagated from cut-

tings. So far as I know, Kew is the only garden where this Solanum is cultivated. It is a native of Rio and Minas Geraes.

London. *W. Watson.*

Cultural Department.

Funkias.

THE genus Funkia is both handsome and useful, and will accommodate itself to almost any soil or situation. From early spring, when the young leaves are first developed above the ground, the plants are ornamental, and in midsummer they give a profusion of beautiful flowers. During the remaining part of the summer, after the blooming season is past, no plants in the garden have more ornamental foliage. They even vie with the best of tropical plants in this respect.

A few years ago I tried to induce good showy herbaceous plants to grow under the shade of some large old Hemlock-trees, but failed to establish any of the sorts tried. In another part of the garden I noticed some stray plants of Funkias growing luxuriantly under the shade of Maples, and soon after I planted the ground under the Hemlocks with several species of Funkias. They have been there for several years now, and have grown luxuriantly and flowered profusely every summer. The small-leaved kinds are desirable for edging large beds, while the large-leaved sorts should be grown where they are not crowded by other plants. In such a position a single plant will soon develop into a large handsome specimen four or five feet in diameter. All the species mentioned in these notes are perfectly hardy and need no protection whatever in winter. They are all herbaceous, and the best way to increase the plants is to divide them just before they begin to grow in the spring. I have transplanted plants in early summer when the leaves were full-grown, with success. If they are disturbed during the summer they ought to be taken up with a good ball of earth and plentifully watered.

The Funkias, or Plaintain Lilies, are liliaceous plants, and come into bloom just as the last of their near relatives, Hemerocallis, are passing out of flower. The specific names of the plants belonging to this genus are very much confused, perhaps owing to some of the species having so many different forms. After carefully comparing our plants with the specimens in the Gray Herbarium, the species in the genus can be reduced to about five, with a number of varieties.

Funkia lanceolata is the species with the narrowest leaves; they are green, five inches long, three inches across and lanceolate, tapering at both ends. The petioles are from ten to fourteen inches long and their edges are short and not incurved. The scapes of flowers are undeveloped, and are as yet hidden among the leaves on our plants; when they are fully grown they rise above the foliage in short racemes of ten or twelve flowers, each flower being in the axil of a bract; they will be in perfection next month. The perianth is of a lilac tinge and about one inch and a half long and trumpet-shaped. There are several good varieties of this species. The variety albo-marginata, as grown here, is a larger plant in all its parts than the species. Its leaves are seven inches long and three broad, and they are edged with a white line which is constant. Its petioles are more broad than those of the species and are broadly channeled. It blossoms earlier than the species, and the first flowers are beginning to open on our plants. Undulata is another variety grown here which has crisped variegated leaves, with large blotches of white. This variety is the first one to blossom here, and it has finished flowering. This plant and its varieties are natives of Japan, and the species was introduced from there in 1829.

Funkia ovata is a desirable plant, with handsome, dark green, shining ovate leaves, which make it pleasing even without its blossoms. The size of the leaves varies greatly on different plants. Some of our plants have leaves three inches broad and five inches in length, while others, although they are all grown near one another, have leaves over five inches in breadth and nine inches in length. The petiole of the leaf in this species varies in length from six to twelve inches, and is deeply channeled and the edges are not incurved. This species has been blossoming for the past three weeks. The scape is about a foot and a half in length, and the flowers are produced in racemes of fifteen to eighteen blossoms, which are held well above the foliage. The individual flowers are of good size, blue on the outside, the inside streaked with white. This species is a native of Japan, northern China and eastern Siberia, and was introduced from there a little over a century ago. It is figured in *The Botanical Magazine* under the name Hemerocallis cœrulea.

Another good species in bloom now is Funkia Sieboldiana. Its foliage is more handsome than that of the other species described; it is as easily grown as any and produces flowers freely. The elegant glaucous leaves are broadly cordate-ovate; they measure about seven inches in breadth and ten to twelve inches in length, and have petioles about a foot in length. The flowers are of a pleasing pale lilac color, and the racemes begin to open just above the foliage. This Funkia is also a native of Japan and was introduced from there in 1836. A variety of this plant grown here has yellow margined leaves and makes a desirable foliage plant.

Funkia subcordata blossoms a little later here than F. Sieboldiana. It has not quite as handsome foliage as some of the other Funkias, but what it lacks in foliage it makes up in beautiful flowers. It is a distinct plant; the leaves are pale green, ovate, with a cordate base; they are about five inches in breadth and eight inches in length. The petioles differ from those on any of the other species, their edges being incurved until they meet. The large white flowers are produced plentifully in good-sized racemes on well-established plants. This plant is quite a favorite in gardens in Cambridge, and is generally known as F. grandiflora.

Harvard University Botanic Garden. *Robert Cameron.*

Autumn-flowering Bulbous Plants.

LYCORIS SQUAMIGERA is now finely in bloom here and also at the place of H. H. Hunnewell, Esq. There is now no doubt about the hardiness of this beautiful Chinese Amaryllad. In its manner of growth it resembles the well-known Belladonna Lily, Amaryllis Belladonna. Each has a separate season for growth and blooming. The Lycoris makes its growth early in spring, throwing up its leaves before frosty weather leaves us. Its foliage never has been injured. The leaves disappear about the end of June, and the flowers appear during August. The flower-scapes are self-supporting, about two and a half feet in height, each carrying umbels of from seven to eight flowers. It is hard to describe the color exactly; in fact, there are several—four of them, at least—blending and fading as the flowers open and mature. Yellow and lavender show in the opening flowers; blue and salmon tints in the mature ones. The perianthic lobes turn upward more than in the true Amaryllis, and there are other minor distinctive characters, but for practical purposes they are alike, and for gardening purposes they can hardly be separated.

Amaryllis Belladonna will be in bloom in a month or so. This species is tender. It commences its leaf-growth as soon as the flowers fade, in the same way as the Nerines. The leaves remain green until June, so that a longer period of rest intervenes between the maturing of the bulbs and blooming. Its handsome rosy pink flowers are larger than those of the Lycoris, but less erect in the umbels. In southern Europe the Belladonna Lily is hardy. With us it requires cool-greenhouse cultivation. The bulbs are best separated when at rest, the smaller bulbs being kept from the blooming ones. Good deep pans are preferable to pots. Rich loam, with a little charcoal, will be a good compost in which to grow the bulbs. Like all the Amaryllis family, they need repotting seldom. They will bloom on for years with only a top-dressing of fresh soil given just before the growing season.

Vallota purpurea, the Scarborough Lily, is also in bloom. This is another lovely autumn-blooming member of the Amaryllis family. It is a native of south Africa, and not unlike some of its allies, the Hippeastrums of the southern hemisphere of the New World. It is partly evergreen, and will not bear resting to the extent the deciduous bulbs will, though less water is required for a month or two prior to the blooming season. The flowers are crimson, borne in erect-flowered umbels about a foot high. Nerine Fothergillii and N. Sarniensis, the latter known as the Guernsey Lily, are charming south African members of the same family. The flowers are brilliant scarlet in the first-named; salmon-colored in the latter. The leaves appear before the flowers fade. They continue all winter, resting during the summer-time.

All these popular autumn-flowering bulbous plants are easily grown. Ordinary loam suits them well, and they seldom require potting. During the growing season abundance of water is required, and less when resting. They will go to rest and resume growth without special treatment. Though all, with the exception of the Lycoris, are tender, inasmuch as they will not bear more than a few degrees of frost, they are distinctly cool-house bulbs, and do best in a moderate temperature.

Montbretias are among our brightest autumn-blooming bulb-

ous plants suitable for border culture, and with the Gladiolus, Tritomas and Galtonias help to make the garden gay when summer-blooming plants are becoming ragged or are going to rest. The Montbretias may be conveniently described as miniature Gladioli, resembling them in the foliage, and also in the one-sided way of blossoming. The flowers, which are stellate rather than campanulate (as in the Gladiolus), are produced abundantly, and the bulbs increase rapidly, so that in gathering a bouquet we can afford to cut some to the ground, taking leaves as well. Used in this way they are serviceable for indoor decoration. M. crocosmiæflora is the best known. It is a bigeneric hybrid between M. Pottsii and Crocosmia aurea. There are besides several seedling forms which have received names. M. Rayon d'Or is yellow, flushed with red; M. Gebe d'Or, pure yellow, distinct and handsome.

Wellesley, Mass. *T. D. Hatfield.*

Orchid Notes.

Rodriguezia pubescens.—This is one of the most beautiful of Orchids, considering the wealth of bloom produced from comparatively small plants; the sprays are long, arching gracefully, and the flowers are of the purest white, with a trace of yellow on the lip. This plant is not new, it having been well known at the time of its introduction, just fifty years ago, but like many other Orchids, as, for example, Cattleya labiata, it became scarce after a time, and not until the rediscovery of the Cattleya did this Rodriguezia appear again. Both Orchids come from the same part of Brazil, Pernambuco. Our plant, in a small pan, had twelve flower-spikes, and it was exceedingly pretty when in bloom, but owing, probably, to the intense heat at the time and the amount of moisture present in the atmosphere, the flowers only lasted a few days. They seem to be self-fertilizing, as a number of the caps containing the pollen were found on the bench under the plant, some at quite a distance, as though they were forced off by some mechanical means, such as those developed in Catasetum and other genera, and a day or two later many of the seed-vessels began to swell. The flowers were evidently impregnated without artificial aid, not common among Orchids, though there are well-known exceptions to the rule. It would be interesting to learn if other cultivators have had the same experience with this Rodriguezia, as I can find no record of this in any work to which I have access. We find it best grown in a pan or other open receptacle suspended in the warmest house; the roots are slender and seem to avoid the compost of living moss as much as possible, preferring to grow out and breathe in the moisture in the atmosphere. It was tried among the Cattleyas for a time, for we thought this ought to be the place for it, as it is found growing with them, but some of the young growths soon began to decay. It evidently was not warm enough there, so it was taken back to the warmer house, where it has prospered. When reintroduced into cultivation, like many more plants, it was thought to be new, and was named afresh R. Lindeni, but it was speedily located in published descriptions of the earlier part of the century, and will henceforth, no doubt, be often seen in gardens.

Cypripedium Thayerianum.—Horticulture is said to be progressive, and we venture to think that botany or botanical nomenclature is also, and if the attempts constantly made to classify and rearrange the work of the hybridist are to be taken seriously, ordinary cultivators will never be able to keep pace with the progress. Cypripedium Boxalli has for nineteen years been generally regarded as a well-marked variety of C. villosum. The flower is different structurally, and there appears to be no evidence of forms merging into the type species, but a late writer on the subject, Hansen, in *The Orchid Hybrids*, has suddenly decided that C. Boxalli must henceforth be considered the same as C. villosum, and a host of hybrids having the former for one parent must then be considered as synonyms, and cultivators will have to begin to learn over again the names of the plants they possess. C. Thayerianum is one of these; it is the result of a cross between C. Lawrenceanum and what is known as C. Boxalli atratum, a dark form, having the large flowers and rich wine coloring of C. Lawrenceanum, with the high polish of C. Boxalli atratum over the whole surface of the flower. Among hybrid Cypripediums it is considered one of the best, and it improves each year in size and coloring, is of healthy vigorous growth and was raised by the Messrs. Sander, of St. Albans, England. It remains to be seen whether Mr. Hansen's many innovations will be generally accepted by botanists, but from the cultivators' standpoint it will make confusion worse confounded. The above is only one of the many reforms suggested.

South Lancaster, Mass. *E. O. O.*

Correspondence.

Two Good Trees for California Planting.

To the Editor of Garden and Forest:

Sir,—For the Pacific coast, I believe, there are no more valuable timber trees for cultivation than the common Locust, Robinia Pseudacacia, and Blackwood, Acacia Melanoxylon. Either, when planted in groves, will send up tall, shapely trunks that, under ordinary conditions, will grow to a diameter of eighteen inches in as many years.

The wood of the Locust has long been in demand for making trenails for ships and for wagon hubs, but it is little inferior to Hickory for any carriage work, and when freedom from decay is a prime requisite it is far superior. It is also excellent for tool-handles, and can be made into furniture of great strength and beauty. It takes a fine finish, as the grain is close and the color a pale yellow. For fence-posts it can hardly be excelled, its lasting qualities being equal to Cedar, but it is too valuable at present for such use. The rough portions and limbs make excellent fuel—equal to Beech and Sugar Maple. In short, there are few uses to which hardwood is put to which the Locust is not adapted. It may be well to say that here it is not afflicted by the borer that has worked such destruction in the western states.

The Blackwood has a more restricted field of usefulness than the Locust, but for certain things is the equal of any tree. There is no better tree for street purposes, and the wood is little inferior to Black Walnut for most uses to which the latter is adapted. It does not work so kindly, however, the grain being somewhat interlocked or "eaty," as it is technically termed; but for turned work in furniture, such as spindles and the like, and for balusters or grill work in house-finishing, nothing is better. And then for fuel it is the equal of any wood Hickory. Being an evergreen and a profuse bloomer in early spring this tree is desirable in many places where deciduous trees are not. At all times it is a pretty tree, with full, well-rounded top and dark shining lanceolate foliage that does not hold the dust so as to destroy its clean and refreshing appearance. It propagates readily from seed and transplants without difficulty.

Why these two valuable trees have not been more extensively grown has always been a mystery to me, especially when the country is dotted over with groves of the comparatively worthless Blue Gum, Eucalyptus globulus. Some day it will be different.

Fruitvale, Calif. *H. G. Pratt.*

The Forest.

The Burma Teak Forests.—IV.

TIMBER OPERATIONS COMMENCED.

As previously stated, Teak timber, in order to become fit for floating, must be killed by girdling, and the trees thus killed must be allowed to stand for two or three years after having been girdled. Under the working plan prepared in 1856, girdling operations commenced in 1857, and the trees that were girdled that year could not be floated and brought to market until 1860. Fortunately, however, I had found, in the forest districts explored by me, large quantities of dry timber, partly felled, partly standing, trees previously girdled or that had died from natural causes. Due notice had been given early to all those who had previously, under the king of Burma, worked the forests to remove their timber. When the time fixed by that notice had expired, the timber in the forests became the property of the Government. Considerable quantities of dry timber was thus available; by employing the people inhabiting the forests or living in the vicinity, I got this timber dragged to the water's edge and floated to the Rangoon timber depot, and by dealing with the Karens and Burmans direct, and not through middlemen, I was able at the outset to give them profitable employment, to make them my friends and allies and to enlist their interest in the protection of the forests. Most of the old timber in question was small and could be dragged by the cattle they had, by oxen and buffaloes, for in those days, with a few exceptions, these people owned no elephants. Gradually, as the work increased, I furnished them with funds to enable them to purchase elephants. In this manner the business extended, gradually but steadily. During the first four years, 1856-7 to 1859-60, mostly old timber was extracted, and only 16,000 tons a year were brought to market, the ton of Teak timber measuring fifty cubic feet. After that time, in consequence of the girdling operations which had been carried on regularly since 1857, the quantity

increased, and during the four years from 1860-1 to 1863-4 the average annual yield amounted to 29,000 tons. Ten years later, during the five years ending 1873-4, the mean yield had increased to 45,000, and twenty years later, during the five years ending 1893-4, to 68,000 tons a year. Altogether, under this system, one and a half million tons of Teak timber were extracted from the forests of British Burma during the thirty-eight years from 1856-7 to 1893-4. This result had been accomplished by girdling during the same period 660,000 trees. The whole of these 660,000 trees, and many more, were mature when operations were commenced by us.

FORESTS ORDERED TO BE THROWN OPEN TO PRIVATE ENTERPRISE.

Under the system which to this day regulates the operations of lumbermen in the United States, the whole of the mature trees which were standing in 1856 would have been girdled at once. Large quantities of timber would thus have been brought to market within a short period, instead of being spread over a long series of years. It has already been mentioned that Rangoon in those days had derived its importance mainly from the export of Teak timber and the shipbuilding trade carried on by means of the Teak timber brought from the forests. Teak at that time was the chief article upon which the prosperity of that town depended, for the export of rice, which since has given it a much greater importance, had at that time hardly begun. The merchants of Rangoon naturally desired to see their business increase rapidly, and as soon as they realized that the system introduced by me in 1856 would limit the quantity of Teak brought to market they commenced a vigorous opposition against it. Personally I made a point of keeping on good terms with them, and they tried hard to induce me to allow them to enter the forests and to cut the whole of the marketable trees. With much show of reason they contended that ships built of teak would soon be a thing of the past, that iron would, in shipbuilding as well as for all other purposes, replace the use of wood. Within a few years the demand for teak would diminish, prices would fall, and in the end teak would be a drug in the market and the Teak forests would be valueless.

At that time the Sepoy mutiny of 1857 had saddled the Government of India with an enormous debt, and the disturbed state of the country had considerably diminished the public revenue. Under these circumstances the merchants of Rangoon urged, as the only proper course, to take advantage of the high market rates for teak then ruling, and, by the sale to them of all mature timber standing in the forest, to realize large sums and thus immediately to produce a large revenue from the forests. More than this, they urged that a business transacted on so large a scale would give a great impulse to the prosperity of Rangoon. These considerations, they maintained, imperatively demanded the acceptance of their proposals. They appealed to my sense of duty toward the Government which I was serving, to my ambition and to my common sense, and they pictured in the darkest colors the disastrous consequences of a refusal to back their proposals. And with justice they added that they, the merchants, stood not alone in their views, but that these views were shared by the majority of the public officers and European residents of the province.

When my friends found that I remained firm, and that Major Phayre, the commissioner, refused to yield to their representations, they went to Calcutta, and backed by the influence of the large and powerful mercantile firms of Calcutta they succeeded in inducing the Government of India to order the commissioner to throw open the Pegu forests to private enterprise. The orders were sent to Rangoon in February, 1861. These orders had to be carried out, but, fortunately, we were not required to throw open the whole of the forests at once. By that time incessant hard work in examining the forests by means of linear valuation surveys and by constant height measurements, especially of the younger classes, had taught me which districts were valuable and which were less so. Those districts, therefore, in which the growing stock of teak timber in regard to height, quantity and distribution of age classes was most promising, were for a time retained under control of the Forest Department, while the rest were thrown open to private enterprise in accordance with the orders received. A large portion of these, the whole of the forests west of the Irawaddi River and others in Martaban, were let upon twelve years' leases, with the permission to girdle. In other districts permits in some cases for three, in others for six years were granted, under which the permit-holder, on payment of certain rates, became the proprietor of the timber extracted by him, being, however, limited in his operations to the timber girdled by the forest officers.

CHANGE OF FOREST POLICY OF GOVERNMENT.

Subsequently a different view of the question was taken by the Government; the arrangements which had been made could not, however, be canceled. The mischief had been done, but, fortunately, it had been limited to the less valuable districts. The really valuable forests, which in 1861 had been retained in the hands of the Government, had been saved, and this made it possible to maintain a good system of management. As regards those forests for which leases or permits had been granted, they were resumed when the term expired, and some of the permits had to be canceled sooner, because it was discovered that the agents of the permit-holder had illicitly girdled Teak on a very large scale.

The experience thus gained served to demonstrate the fallacy of the popular opinion which had been long maintained, and which had been defended with eloquent enthusiasm, that the management of the Burma forests could be safely left to private enterprise.

It will be remembered that the third of the great aims which I had proposed to myself in 1856 was as soon as possible to produce an annual surplus revenue. This, however, was more easily said than done. During the first two years the outlay necessarily greatly exceeded the income, and it was only in 1858-9 that the sales at the Rangoon timber depot yielded a large surplus, which, however, was barely sufficient to cover the deficit of the first two years. This result had been accomplished entirely by the sale of the old timber found in the forests when operations were commenced. As the fresh-girdled timber came in, after 1860, the surplus rose steadily. During the eleven years from 1868-9 to 1878-9 it amounted to 543,000 rupees a year on an average, while during the ten years from 1879-80 to 1888-9 it came on an average to 945,000 rupees a year, and during the five years ending with 1893-4 to 1,870,000 rupees.

Up to 1879-80 the whole of this surplus revenue was derived from Teak timber, the increase being due partly to the larger quantity and the better quality of the timber brought to market, partly to the gradual and, in spite of occasional fluctuations, fairly steady rise of prices. In 1856 the declared value of Teak timber exported from Rangoon was forty rupees a ton of fifty cubic feet, and during the five years ending in 1893-4 it fluctuated between seventy-two and eighty-two, being on an average seventy-five rupees.

OBSTRUCTIONS IN RIVERS CLEARED.

One important fact must here be noted, which has greatly aided the realization of a steadily increasing revenue. When I commenced work in 1856 I found that all Teak-producing tracts on the outskirts of the forests, and those in the hills which were near good floating streams, had been completely cleared out, the stumps alone of Teak-trees remaining with the half-burnt tops and branches of the trees. Large areas of Teak-producing forest, however, had, fortunately, been closed against the extraction of timber by obstructions in the rivers. These obstructions were of two classes. Some were caused by the silting up of mountain streams coming down from the hills with great velocity, carrying with them masses of sand silt and rubbish, which they deposited on entering the level country of the main valley. Some streams were more liable to silt up than others, and some of the richest Teak localities near the open country had been protected by such obstructions. In the majority of cases it was sufficient to clear the silt away, but in some it was necessary to dig canals in order to regulate the course of the river, and thus to open it for the floating of timber. The other class of obstructions was caused by bowlders and barriers of rock in the bed of the hill streams. A large extent of the most valuable Teak-producing tracts in the hills had on that account never been worked. Early on my first tour in 1856 I had discovered and examined some of the most formidable of these rocky obstructions in two large tributaries of the Sitang River and had explored the forests on the hills drained by these streams. I then had formed my plans for the removal of these obstructions, but at that time my position was not sufficiently secure to take action. Beginning with 1858, however, blasting parties were employed for the removal of these obstructions. Men trained to that kind of work not being available in Burma, parties of Coringa workmen were brought across the Bay of Bengal from the Coromandel coast to start the work. The undertaking was not an easy one. The places where the rocks had to be blasted were in the midst of the forest, far away from any village, difficult of access, in deep unhealthy valleys. Hence, after the Coringa men had done a few years' excellent work, the fever of the Burma jungles had decimated their ranks, and it became difficult to replace them by men from their own country. This

difficulty I had foreseen, and had associated with them a band of Red Karens, hardy, but most unruly, mountaineers, whom I had attached to me personally, who had been my most faithful followers and had enabled me to explore the forests rapidly and thoroughly. The Coringa blasters were Hindus, very skillful, intelligent and exceedingly cautious. With them no accident had ever occurred. The Red Karens, on the other hand, were impulsive, bold, but exceedingly careless, and severe accidents became numerous. However, the work went on, and is being continued year by year to this day, gunpowder having been replaced by dynamite. The number of these rocky obstructions was very large, but gradually they are all disappearing.

Bonn, Germany. *Dietrich Brandis.*

Notes.

The Royal Gardens of Kew were visited by seventy-three thousand persons on the August bank holiday this year.

A plant of the Mammee Apple is now flowering for the first time in the economic house at Kew. The plant is ten feet high and in a large pot, and some of the flowers have set for fruits. Some of these immense fruits, which come from the West Indies, are now to be seen in our fancy-fruit stores.

According to *The Orchid Review*, Mr. H. T. Clinkaberry, gardener of C. G. Roebling, Esq., of Trenton, New Jersey, has succeeded in raising some hybrid Vandas from seed. V. tricolor was taken as the seed parent and it was fertilized with pollen of V. Sanderiana. It is to be hoped that the plants will live to produce flowers.

The Gardeners' Chronicle speaks in high terms of the new hybrid Tea Rose, Marjorie, which strikingly resembles in color Margaret Dickson. The flower, however, is not so large, but has the advantage of being fuller in the centre and more compact, while the plant is of dwarfer habit and produces flowers at the end of every shoot. It was raised by Mr. Alexander Dickson, Newtownards.

At the recent Florists' Convention Mr. James Dean said that the new type of Canna, popularly called the Orchid Canna, of which Austria, Italia and Burbank were examples, had grown well with him when planted out, and, although they had burned some in the sun, he thought that under certain conditions they might succeed. As greenhouse plants, of course, they are magnificent.

Meehans' Monthly states that if Radish seed is sown in late September in a frame where the temperature is kept as much as ten or twelve degrees above the freezing point the roots will be large enough for use soon after Christmas. Of course, frost will not hurt them, but they will not grow unless the temperature is above the freezing point, and with care good, fresh radishes can be had in this way until spring.

Mr. Joseph Meehan calls attention to the fact that our native Asters, many of which are admirable plants for the autumn garden, will grow readily from seed. Gather the seeds from the plants of good species and varieties when they are ripe in the autumn and sow them at once, covering the bed with a light layer of forest leaves. Transplant the young seedlings next spring when they are large enough, and they will blossom the same year.

The ripened fruits of the Sassafras are not often seen upon the tree, for they are borne very sparingly as a rule, and eaten off by the birds. In particular years and places this fruit is very abundant, and when ripe at this season they are highly ornamental. In one of the parks above the Harlem in this city there is a fine tree, and the blue fruits, borne on fleshy pedicels, and thick calyx lobes of a deep rose color in abundant clusters are strikingly handsome as they appear among the rich green leaves.

Last week the receipts of California fruit were larger than they have ever been in this market for the same length of time, ninety-seven car-loads having been sold at auction. The weather has been favorable so that the fruit has not been hurried to its ripening, and the desirable varieties of prunes, plums, peaches and pears have brought fair prices. Worden and Niagara grapes of fair quality are now coming from the Hudson River Valley district, and among the apples from near-by points Alexander and Gravenstein are bringing the highest prices. Nectarines in the fancy-fruit stores are handsomer than usual and readily command $1.00 a dozen.

A. L. Goldsborough, in *The Strawberry Culturist*, contends that the best time for transplanting Strawberries in his latitude is between August 15th and October 15th. The main expense in Strawberry-culture is in weeding, and when planted in late summer or early autumn the ground can be entirely rid of these pests before the plants are set, whereas when they are set in spring it would be almost impossible to keep the weeds down. In a small garden two feet apart is wide enough for the rows. Any time after a rain young plants can be taken up and every portion of soil should be shaken from the roots to get rid of weed seeds and the eggs of insects. The ball of earth is a delusion. In straight rows, where plants have light and root-space without limit on two sides, four inches apart is ample.

Sometimes when the grade of streets or grounds is to be raised it is desirable to elevate the trees at the same time. Near Philadelphia, according to *Meehans' Monthly*, trees fifty feet high and with trunks eighteen inches in diameter are lifted with very little check to their growth in the following way: A trench is dug around a tree so as to leave a ball of earth, and when it is dug to the proper depth the earth is spaded from under the ball on one side and a block set under the roots as a fulcrum. Two guy ropes are then attached to the tree, one on the side where the block is set and the other opposite it. When the rope toward the block is drawn the tree is tilted and the mass of roots is lifted up on the opposite side. Earth is then packed under the elevated roots and then the rope on the side is drawn. This lifts the roots on the block side and more earth is placed there. In this way the tree by being swayed backward and forward, having earth thrust under it at each tilt, is soon elevated as many feet as is needed and stands on the summit of a firm mound of earth.

The forests of Russia, exclusive of those of central Asia, Caucasia and Finland, extend over a space of 478,000,000 acres, or about forty per cent. of the total area of the empire in Europe. This amounts to about five acres to each inhabitant, which might suffice to meet the requirements of the country in this respect if the ratio of the forest to the population were uniform. But in reality in the densely populated regions of southern Russia woodlands are scarce, while in the four most northern provinces there are nearly seventy acres of forest to each inhabitant. The disadvantages of this unequal disposition of the forest are aggravated by the immense distances which separate the thinly wooded districts of the south from the rich forests of the north, by the lack of water communication and the cost of carriage by rail. Plans for reforesting parts of the denuded area are therefore under consideration by the Government, and since private owners cannot be trusted to look forward to future supplies there is no doubt that the empire will assume the guardianship and administration of these forests.

In 1883 a disastrous eruption desolated the island of Krakatoa and left it covered with a layer of cinder and pumice-stone to a depth of three to one hundred and fifty feet, and this was so intensely hot that it destroyed all animal and vegetable life. Three years after the eruption the place was visited by Dr. Treub, whose observations are interesting, since they show how absolutely a barren island may become covered with vegetation. In writing of this incident, Mr. W. Botting Hemsley says in *Knowledge* that the island is about three miles across, with an altitude of 2,500 feet, one side presenting an almost perpendicular wall to the sea and the other sloping steeply. It is twenty miles from Sumatra, twenty-one from Java, and the nearest point where there is any vegetation is an island ten miles away. Cinders and pumice-stone are not fertile, but moisture and chemical action are helpful, and one class of plants prepared the way for higher ones. The first spores to germinate were those of filamentous algæ carried by the wind and sea, and caused a certain amount of disintegration. Individually the plants are microscopic, but they multiply enormously and form a green film-like tissue over the surfaces where they grow. The action of these organisms and their own decay form the medium in which the spores of Ferns brought by the wind germinated and developed, and Dr. Treub found eleven species of Fern, some of them already common. These prepared the soil for plants of a still more complex organization, and, although they were as yet rare, Dr. Treub found that fifteen species of flowering plants had already established themselves. These were partly seaside plants whose seed had floated to the island, partly plants whose seed were dropped by birds or carried by the wind, since eight species were found on the mountainous interior of the island. Last year Dr. Treub visited Europe, and on his homeward voyage he passed within view of the island, which was then covered with vegetation. This is a most instructive lesson in the natural distribution of plants on account of its being the result of actual observation.